MOODs: Building massive open online diaries for researchers, teachers and contributors

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MOODs: Building Massive Open Online Diaries for Researchers, Teachers and Contributors

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Abstract
Internet-based research conducted in partnership with paid crowdworkers and volunteer citizen scientists is an increasingly common method for collecting data from large, diverse populations. We wanted to leverage web-based citizen science to gain insights into phenomena that are part of people's everyday lives. To do this, we developed the concept of a Massive Open Online Diary (MOOD). A MOOD is a tool for capturing, storing and presenting short updates from multiple contributors on a particular topic. These updates are aggregated into public corpora that can be viewed, analysed and shared. MOODs offer a novel method for crowdsourcing diary-like data in a way that provides value for researchers, teachers and contributors. MOODs also come with unique community-building and ethical challenges. We describe the benefits and challenges of MOODs in relation to Errordiary.org, a MOOD we created to aid our exploration of human error.

Author Keywords
Citizen science; crowdsourcing; human error; ethics; diary studies; Twitter

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Errordiary entry #1903:
"Don't enter your PIN instead of the tip when paying for coffee. Makes for a very expensive treat £XXXX."

Introduction

Diary studies have been a popular method for investigating HCI problems 'in the wild'. For example, diaries have been used to investigate topics such as user information requirements [10] and task management strategies [4]. Although pen-and-paper approaches to diary studies have been augmented and enriched by technology-supported techniques for recording experiences [e.g., 10], the relationship between researchers, diary keepers and entries has remained largely unchanged; participants submit their entries to researchers and the data are presented anonymously in aggregate.

In most cases, unidirectional relationships where entries flow from participants to researchers are sufficient to meet the data collection requirements of a particular research question. However, such an approach does not leverage the potential for diaries to be community-built, collaborative spaces that produce value for researchers, teachers and contributors.

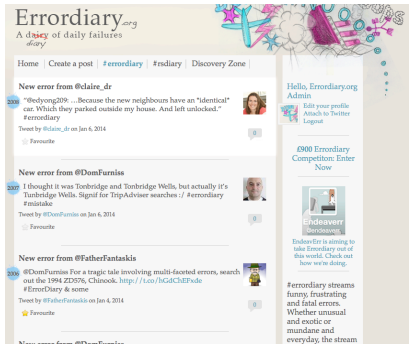
This paper presents a model for diary-style data collection that harnesses an open, accessible, web-based platform to capture, display and curate diary entries. We call this model of participation a Massive Open Online Diary. We explore the potential benefits and challenges associated with MOODs through a long-running exemplar, the Errordiary project. In particular, we focus on the contribution that MOODs can make to research, teaching and participants while considering the community-building and ethical challenges that a project of this type faces. Of course, there are other outcomes and challenges that MOODs must address, but we chose these benefits and challenges as we see them as essential considerations for any MOOD.

Massive Open Online Diaries

Crowdsourcing, whether through paid, work-centric platforms such as Amazon's Mechanical Turk or through research-driven citizen science projects has proved to be a useful method for collecting large quantities of data. Previous research efforts have used citizen science techniques – where volunteers collaborate with professional scientists to conduct scientific research – to investigate questions in a number fields (e.g., astronomy [7]). Sometimes crowdsourcing approaches have simply replicated standard methods online. Other research has used crowdsourcing to pioneer entirely new techniques of data collection. A MOOD is a hybrid method for data collection that combines traditional diary techniques with the benefits of an open online collaborative space.

A MOOD invites individual contributors to make short diary-like posts on a particular topic of interest to both researchers and contributors. Contributions can be made through microblogging services, like Twitter, or through more traditional website-based interactions. These short, timely updates are then added to a publicly accessible corpus from which they can be searched, shared or analysed.

Aggregating short posts into online corpora is an idea that has been developed in the past by a few online communities. For instance, the journalist-run Everyday Sexism project (everydaysexism.com) exists to collect examples of casual sexist behaviour experienced by contributors. Posts are made directly to the site or harvested from Twitter. The project is a good example of online activism – a cause has been identified and the project serves to highlight the need for change. User contributions reinforce the perception that action is



Contributors can add their entries through Twitter using the #errordiary hashtag or directly through the Errordiary website.

required while providing illustrative examples that make it easy for visitors to grasp the issue.

Despite the success of these kinds of projects in gaining large user bases and significant media attention [1], we are unaware of any projects that have used a MOOD-like approach to meet the goals of a research agenda. In this paper we present such a project, through a case study of a long-running investigation of human error, the Errordiary project.

The Errordiary project

The Errordiary project (errordiary.org) has been running since 2009. The goal of the project is to collect examples of everyday human errors that are valuable to researchers, teachers and contributors. Errordiary builds on a tradition of diary-led studies of human error, for instance, Sellen used diary studies to develop a taxonomy of everyday errors [9].

We took a diary-like approach for the project because diary entries incur relatively low time costs for contributors and researchers and are suitable for longitudinal use. In an effort to encourage pithy contributions, reduce the time costs involved in participating and to reduce the effort required for people browsing the corpus to read the entries, we initially limited the platform for making contributions to Twitter. The length of entries was thus limited to 140 characters. Errordiary currently has over 2000 entries from over 130 contributors and covers everything from errors during beverage-making to lost keys.

The general concept of a MOOD was developed from our experience with Errordiary. In the rest of this paper we describe some of the problems that we had to solve as part of the project, the solutions we developed and the broad applicability of these problems to potential MOOD implementations in future.

Research

The primary objective of MOODs should be to collect useful research data; this distinguishes them from projects like Everyday Sexism. As MOODs are living corpora without defined finishing dates, data can be drawn-off as required to answer questions that might evolve over the course of a project. Data from Errordiary has already been employed in novel research. For instance, data on the individual strategies contributors have used to avoid error were collated and coded to determine whether such strategies can be grouped by a smaller set of types [6].

As well as the raw data they produce, MOODs can also offer researchers meta-insights into their research agendas. For example, by calling for contributions on the broad topic of everyday errors, we have come to better understand the types of events that people see as errors. The ‘favouriting’ system built-in to Errordiary allows contributors to select the entries that they think best represent the project. Such tools allow for a participatory form of research that provides researchers with perspective on their research questions that they might otherwise lack.

Teaching

The openness of MOODs also makes them an ideal resource for use in teaching. In the case of Errordiary, we have used the corpus extensively in our teaching of human error to undergraduate and postgraduate students [11]. We have found the entries particularly useful for classification exercises; asking students to

classify a random selection of entries gives them insight into the strengths and weaknesses of taxonomies and an appreciation of the difficulties involved in dealing with messy, real-world data. This approach resulted in students actively engaging with the project; several students who participated in our in-class Errordiary activities went on to make contributions to the project.

By themselves, diary entries may not provide sufficient context for teachers and students to be able to effectively use a MOOD's corpus. For Errordiary, we have provided supplementary materials such as lesson plans, instructions and printable materials for teachers.

Contributors

In the tradition of citizen science projects, MOODs also provide an opportunity for contributors to get something back for their efforts. This is a major advantage over traditional diary studies where there is little opportunity for contributors to gain understanding of the topic on which they are contributing.

In an initial interview study of eight Errordiary contributors, we found that apart from research motivations, participants' main reasons for contributing were because they found it entertaining (3 people) and intriguing (3). Learning was not a major objective for participants, but six of the contributors suggested that they learned something from the project; this was mainly through an increased awareness of the kinds of errors and mistakes people make (3).

Building engagement

Understanding the motivations of contributors is a major challenge for any MOOD. This was no less the case for Errordiary, and it was necessary to develop a number of techniques for building engagement with the project. For a MOOD to work, it needs regular contributors. One of the difficulties of developing communities around MOODs is that one of their objectives should be to raise awareness of an issue; if there is little awareness of an issue before the MOOD is established however, where do users come from and how can a community be built? The issues contemplated by projects like Everyday Sexism are already well recognized. For some MOODs, drawing attention to issues that are important but lack visibility will be a key objective. Understanding how to gain visibility is therefore critical to success.

The issue that Errordiary engages with – the psychology of human error – is a good example of an important issue that has little mainstream awareness. More than 100,000 people in the USA die each year from preventable medical errors [3], but there is little mainstream dialogue about error. It was therefore necessary to foster engagement with the project.

The first and perhaps the most important strategy was to identify an existing group that might already have a strong interest in the topic that a MOOD is intended to cover. With Errordiary, anyone concerned about human error and its consequences was a target, in particular people for whom the costs of error are high and salient. With this in mind, we attempted to involve medical professionals in the project. This served as another important lesson; when identifying the target audience for a MOOD, ensure there are no barriers to participation. In our experience, medical professionals were reluctant to involve themselves in the project in fear of disciplinary action and projecting a negative impression of the services they delivered.

We also hypothesized that additional supporting material might increase engagement with a MOOD. For instance, by providing more information on the topic that a particular MOOD aims to deal with. We tested this theory by creating supplementary materials that explore human error in more depth than the short entries in the Errordiary corpus. Our 'Discovery Zone' comprises newspaper cuttings, a discussion forum, blog posts on human error research and several allegorical short stories. This aims to give contributors more context to the problems we are trying to solve and the way in which their entries might be used. We are currently evaluating the effectiveness of this addition.

In addition to methods for increasing long-term engagement, we also explored increasing engagement through the use of short-term incentives. With Errordiary, we have launched competitions with cash prizes to boost involvement with the project. Prizes covered a number of categories to encourage different kinds of contributions. For example, we offered prizes for the funniest entry. We also encouraged particular classes of contributors (e.g. those with diabetes) with specific prizes. The competitions we ran more than doubled the number of people contributing.

Ethical considerations

The ethical issues surrounding data collection from online communities were identified some time ago [5], but have recently come to the fore [13] with the development of techniques that use social networks as a source of data. Social networks contain a wealth of personal data that participants may not want stored. Caution is required as it is possible to identify individuals from anonymised social network data [12].

There is a tension between observing proper ethical protocols and accommodating the fact that data on the Internet are often public and there are practical issues in gaining informed consent. This tension has been widely discussed by research ethicists and researchers who make use of such data [8, 13]. The Association of Internet Researchers "advocates a bottom-up, case-based approach to research ethics" [8]. With this in mind, we based our ethical approach on the particular research and technology constraints we faced. We think that all MOODs should undertake such a process, weighing ethical needs against practical limitations.

Errordiary harvests posts from Twitter, which provides coarse-grained privacy management. Tweets are either protected, in which case users must approve access to them, or they are public and can be seen by anyone with a Twitter account or a tweet-harvesting system. Given that users consistently and significantly underestimate the size of their audiences on social networks [2], our concern was that harvesting tweets with the *#errordiary* hashtag might also gather tweets from users who were unaware that their tweets were being gathered and then displayed on a public website.

We developed a procedure that balanced users' right to give consent against the technical constraints of building a protocol on a platform that was not designed with research ethics in mind. Whenever our harvester picked up a tweet with the *#errordiary* hashtag from a new contributor, a tweet mentioning the user and a link to privacy policy was sent. After reading the privacy policy, users had the option to opt-out, preventing Errordiary from capturing their tweets. They could do this either by confirming this through their Twitter account or by emailing us. Due to the way that Twitter

regulates direct messages between users it was not possible to send this privately. Users who created an account at Errordiary.org were also given a privacy and data use policy to read. We felt that this approach satisfied ethical concerns for users who had already shared their errors openly. Using a complete informed consent approach would have undermined the casual nature of contributing and compromised the project.

Conclusion

This paper presents MOODs, a valuable tool for researchers, teachers and contributors. Our project, Errordiary, implements these concepts to record instances of everyday errors. The corpus has reached a moderate size and we are currently analyzing the entries to determine whether there are recurring patterns in the errors that participants report. In the long term, our goal is to produce a portable platform that would allow researchers deploy MOODs for their own research quickly and without technical knowledge.

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References

[1] Bates, L. 2013. Everyday Sexism Project hits 50,000 entries - what does that tell you? *The Guardian*.

[2] Bernstein, M.S. et al. 2013. Quantifying the Invisible Audience in Social Networks. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 21–30.

[3] Committee on Quality of Health Care in America and Institute of Medicine 2000. *To Err is Human: Building a Safer Health System*. National Academies Press.

[4] Czerwinski, M. et al. 2004. A diary study of task switching and interruptions. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 175–182.

[5] Eysenbach, G. and Till, J.E. 2001. Ethical issues in qualitative research on internet communities. *BMJ*. 323, 7321, 1103–1105.

[6] Furniss, D. et al. 2012. Cognitive Resilience: Can We Use Twitter to Make Strategies More Tangible? *Proceedings of the 30th European Conference on Cognitive Ergonomics*, 96–99.

[7] Lintott, C.J. et al. 2008. Galaxy Zoo: morphologies derived from visual inspection of galaxies from the Sloan Digital Sky Survey. *Monthly Notices of the Royal Astronomical Society*. 389, 3, 1179–1189.

[8] Lomborg, S. 2013. Personal internet archives and ethics. *Research Ethics*. 9, 1, 20–31.

[9] Sellen, A.J. 1994. Detection of Everyday Errors. *Applied Psychology*. 43, 4, 475–498.

[10] Sohn, T. et al. 2008. A Diary Study of Mobile Information Needs. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 433–442.

[11] Wiseman, S. et al. 2012. Errordiary: Support for Teaching Human Error. *CHI 2012: the 30th ACM Conference on Human Factors in Computing Systems: Workshop: A Contextualised Curriculum for HCI*.

[12] Zhou, B. and Pei, J. 2008. Preserving Privacy in Social Networks Against Neighborhood Attacks. *IEEE 24th International Conference on Data Engineering, 2008. ICDE 2008*, 506–515.

[13] Zimmer, M. 2010. "But the data is already public": on the ethics of research in Facebook. *Ethics and Information Technology*. 12, 4, 313–325.